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ABSTRACT

One of six documents describing the Management Information System for Vocational Education (MISVE), this document is intended to provide administrators and managers with information needed by them to estimate resource requirements for implementing MISVE in their State, plan for selecting and implementing generalized computer software, plan for adapting the prototype package, and plan for information flow. (MISVE was designed to provide users with an advanced management information system (MIS) capability that could effectively respond to current information needs of vocational education managers, to their new and emerging data needs, as well as permit adaptability in meeting unique operational requirements.) Two sections are included: Section I is concerned with planning concerns that need to be considered by MISVE management and staff responsible for system operations. (These concerns include orienting data suppliers and consumers to MISVE, planning for information flow, and planning for staff training.) Section II details the resources required to install and operate MISVE. (SH)

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RESEARCH AND DEVELOPMENT SERIES NO. 127D

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MANAGEMENT INFORMATION SYSTEM FOR VOCATIONAL EDUCATION

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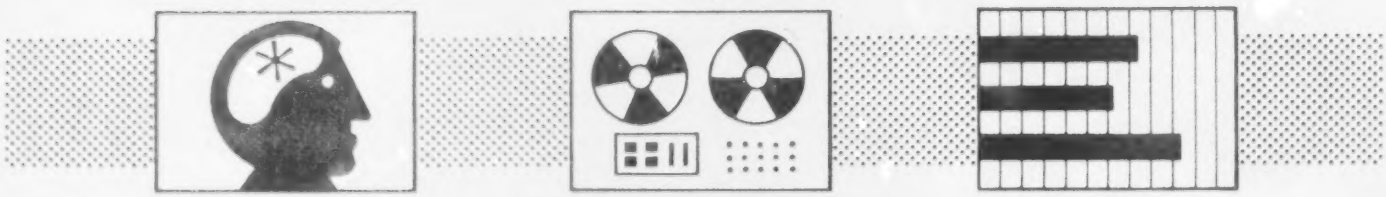
MISVE ADMINISTRATORS' ORIENTATION



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THE CENTER FOR VOCATIONAL EDUCATION
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- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

RESEARCH AND DEVELOPMENT SERIES NO. 127D

MISVE ADMINISTRATORS' ORIENTATION

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1977

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U.S. DEPARTMENT OF
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FOREWORD

Vocational education agencies require management information systems that will assist them in their program planning, evaluation, monitoring and reporting responsibilities. The Management Information System for Vocational Education (MISVE) was designed to provide users with an advanced MIS capability that can effectively respond to current information needs of vocational education managers, as well as to their new and emerging data needs. The system has been planned to permit great adaptability in meeting the unique operational requirements of its users.

Invaluable cooperation and assistance in the development and field trial of MISVE was provided by Robert Stump, project officer, the National Institute of Education; Jack Wilson, project officer, the U.S. Office of Education, Bureau of Occupational and Adult Education, Division of Research and Demonstration; and to the staff of the Colorado State Board for Occupational Education who were involved in the MISVE field trial. Recognition is due also to the staff of MRI Systems Corporation who developed the MISVE applications programs and assisted in the preparation of MISVE documents, to the many state staff persons who served on MISVE applicability panels to review system developments and outputs, and to the many persons who provided reactions and valuable advice for revising the present set of MISVE documents. Significant contributions to the final product were also made by Harold Starr, project director; Michael Black and Kenney Gray, research specialists; and other Center staff.

Robert E. Taylor
Director

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PLANNING FOR MANAGING MISVE

SECTION I

PLANNING FOR MANAGING MISVE

SECTION I

Assuming that a commitment has been made to implement MISVE, several major preparatory activities will need to be undertaken by agency management before the prototype MISVE can become fully operational. These preparatory activities include:

1) pre-planning for implementing the prototype MISVE within the user's unique management, educational, and EDP environments;

2) defining the service and maintenance functions for which the MISVE management and technical staff will be responsible; and,

3) planning for staff training.

1. PRE-PLANNING CONCERNS

As soon as management has made a commitment to implement the prototype MISVE it will want to assure that MISVE will be accepted as easily as possible within the user's management, educational, and computer services environments. The formation of an advisory committee(s) to the MISVE staff is one way to achieve this objective.

The MISVE staff and agency management will need to address such concerns as:

1. the need for modifying the MISVE prototype data base to meet user requirements;

2. the implications of suggested data base content on resource and time requirements at both state and local levels;

3. the effects on the computer center of implementing MISVE computer software; and,

4. the implications of locating MISVE management and operations at different locations within the table of organization.

2. DEFINING THE FUNCTIONS OF MISVE PERSONNEL

The activities of MISVE personnel in the vocational education agency will focus on two major functions. The first is the service function which concerns the output of management useful information for management decision-making. The second is concerned with maintenance functions involved in the refining of system components and procedures.

2.1 Service Functions

MISVE personnel will be responsible for:

- conducting orientation to MISVE for state agency and local school district staffs;
- organizing an information flow network;
- generating ad hoc, standard, and interpretive informational reports to meet the reporting and accountability requirements of the state division of vocational education, and external policy-making bodies and agencies such as state advisory councils, local school boards, and the U.S. Office of Education;
- providing a core of data-based information to assist management and service area personnel in developing annual and long-range program plans, and in managing and monitoring ongoing program operations; and,
- providing school districts with feedback of data that could be useful for developing local annual and long-range program plans, for improving instruction, and for meeting local accountability purposes.

2.2 Orienting State and Local Staff

In implementing MISVE, like instituting other major organizational changes, a high degree of concern is required on the part of MISVE management personnel for public relations. This concern for public relations is useful in securing active cooperation and participation of state and local education personnel. It is important that MISVE staff anticipate ap-

prehensions on the part of some state and local level personnel who may view adoption of a comprehensive MIS as an unnecessary additional burden or a threat.

2.2.1 orienting state staff

Staff in the agency implementing MISVE will require orientation in order that they can use the results of the system and respond to questions coming from local level vocational program personnel. At a minimum, staff will need to understand:

- directions for completing MISVE data at the local level (e.g., use of SDIs or conversion of existing data to a prescribed tape format);
- the time frames for collecting MISVE data;
- staff roles in the process of data collection; and,
- the procedures for requesting and using the MISVE report generation capabilities.

2.2.2 orienting local school district staff

Successful implementation of MISVE by the state vocational agencies requires the cooperation of local school districts who will be providing source data. Thus, it is essential that key local level personnel be involved in the installation process. It would be beneficial to have MISVE personnel sponsor orientation meetings to inform local school district personnel concerning:

- the purposes of the system;
- the procedures for providing MISVE data;
- feedback procedures; and,
- the potential usefulness of the system for local program planning.

Orientation time should include a discussion of instructions and time frames required of local staff to complete MISVE SDIs and return them to the state agency. Another function of

such orientation meetings is to solicit suggestions from participants concerning procedural aspects for local participation and to determine if additional data need to be included in the data base that would be of value to local program planners.

Periodic meetings with local personnel would be useful once the system is installed and operating. These meetings would be used to:

- describe anticipated changes in procedures or in the data base;
- determine potential implications for local districts that might be created by data base changes; and,
- solicit reactions and suggestions for the improvement of MISVE to make it more useful at both the local and state levels.

3. ORGANIZING AN INFORMATION FLOW NETWORK

Major activities in a hypothetical information flow are illustrated in Figure 1, Information Flow. There are three identifiable phases in the illustrated hypothetical information flow. Phase one deals with preparatory activities which must be carried out before local districts receive MISVE source data instruments (SDIs). These organizing activities are steps 1 through 3, Figure 1. Phase two, steps 4 through 8 in the Information Flow, involves the operational activities which begin with the distribution of SDI to local districts and ends with the distribution of reports to a variety of audiences. Phase three in the Information Flow, steps 9 and 10, Figure 1, involves assessment activities required to improve and revise the MISVE system in preparation for recycling.

This hypothetical Information Flow Sequence is provided as a point of departure for the more elaborate and detailed planning that will be required of the MISVE staff to organize an Information Flow Network. In developing an operational

information flow network, MISVE staff will need to be concerned with resource requirements, time schedules, and the need to integrate the information flow network with the state agency's overall planning cycle.

3.1 Information Flow Concerns

The following discussions describe several of the elements in information flow planning that might be addressed by MISVE staff.

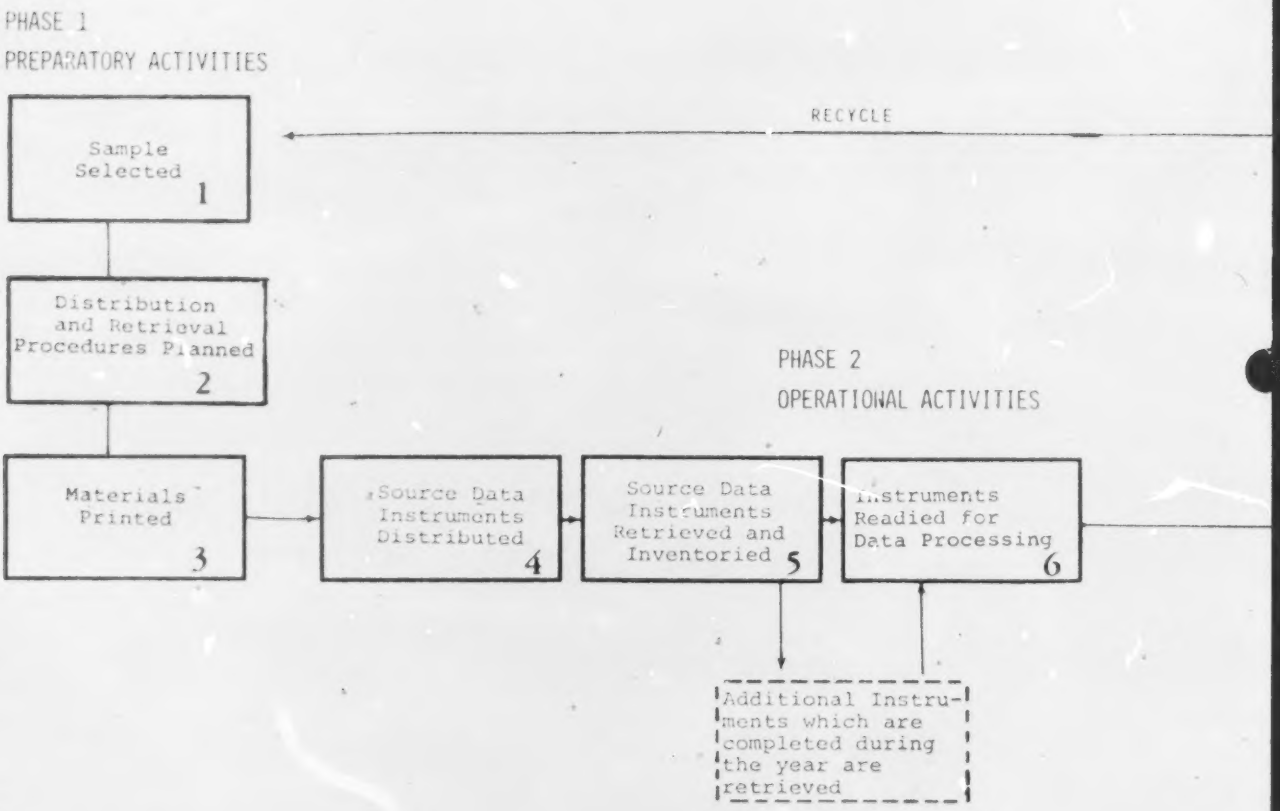
3.1.1 selecting an appropriate sample (Activity 1)

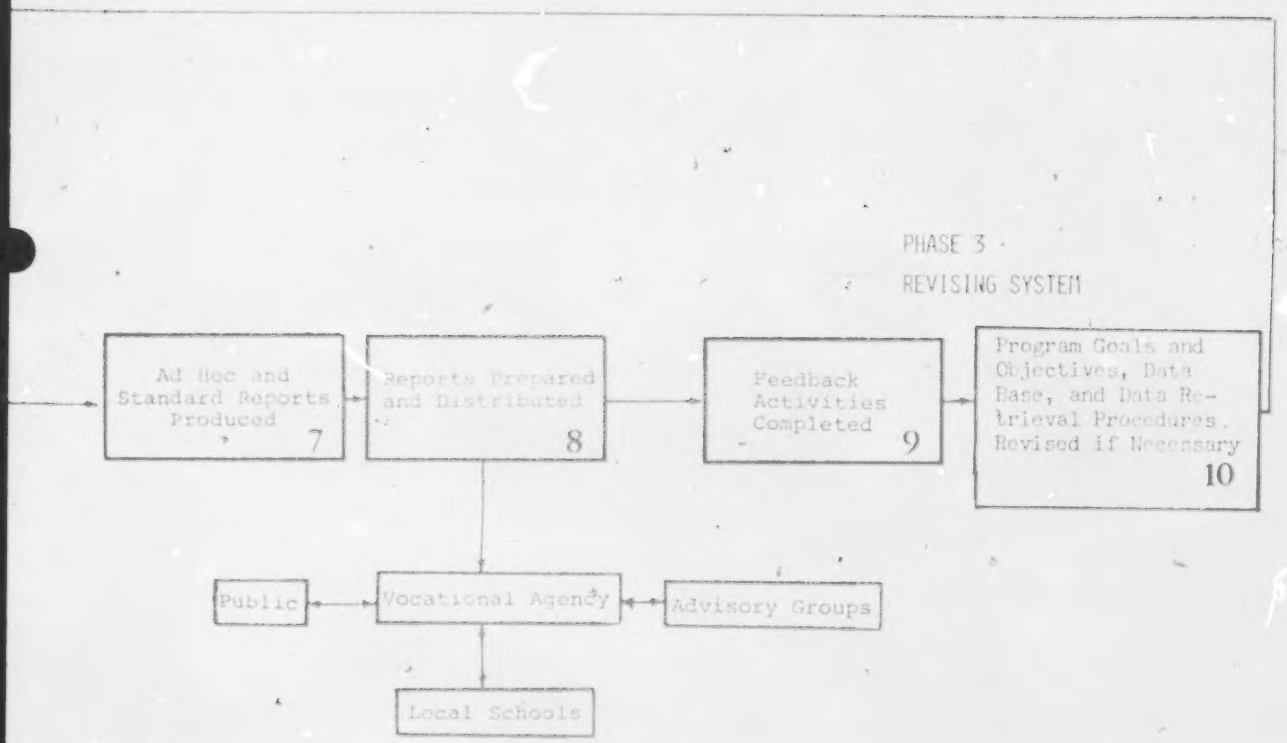
Two major considerations and their trade-offs need to be assessed in determining whether to collect data about schools, programs, and students on a universe or sample basis. The first consideration has to do with system costs; the second consideration deals with usefulness of system outcomes to state and local school program managers. Obviously system costs rise as greater numbers of schools, programs, and students are involved in the data collection procedures. It is generally obvious that unless a local school or vocational program is included in the sample and data are collected from it on a continuous basis, that school or program cannot benefit equally from system feedback from the state office as do schools or programs included in the sample. Thus, each state will need to weigh the trade-offs of greater cost savings through sampling (or reducing sample size) against usefulness of the system to greater numbers of schools who might potentially be involved in the data collection effort.

Decisions will need to be made about the extent to which students in adult level vocational programs are to be involved in the data collection. Students in adult level programs are singled out because they often make up a substantial portion of the total vocational program enrollment, many of these per-

FIGURE 1

INFORMATION FLOW


PHASE 1
PREPARATORY ACTIVITIES
RECYCLE
Sample Selected 1
Distribution and Retrieval Procedures Planned 2
PHASE 2
OPERATIONAL ACTIVITIES
Materials Printed 3
Source Data Instruments Distributed 4
Source Data Instruments Retrieved and Inventoried 5
Instruments Readied for Data Processing 6
Additional Instruments which are completed during the year are retrieved


PHASE 3 -
REVISING SYSTEM
Ad Hoc and Standard Reports Produced
7
Reports Prepared and Distributed
8
Feedback Activities Completed
9
Program Goals and Objectives, Data Base, and Data Retrieval Procedures, Revised if Necessary
10
Public
Vocational Agency
Advisory Groups
Local Schools

sons are enrolled in short-term courses, and many are already employed on a full-time basis. MISVE management will need to determine the uses and extent to which data about individual students in adult level vocational programs are required for planning and reporting purposes and estimate the costs for various sample sizes of adult program enrollees. Again, trade-offs between costs and benefits will be required before a final determination by agency management can be made.

The proper application of sampling techniques to the problems of obtaining representative data about schools, programs, and students is complex and requires special expertise. In the event that the state's MISVE staff lacks such expertise, consultations with an appropriate agency, e.g., university specialists, should be arranged to explore sampling procedure alternatives.

3.1.2 planning for distributing and collecting data (Activity 2)

The need for careful study by MISVE personnel to determine the most efficient mechanical procedures for collecting data from local schools cannot be stressed too strongly. This would take into consideration the point in time at which the schools could be expected to be able to provide accurate data and the lead time necessary for use of the data to meet local and state reporting requirements. Coordinating the mechanics of data form distribution and collection and determining data processing requirements and schedules will be major in-house planning activities for the staff.

Thus, time frames must be established for distributing and collecting source data instruments in order that data can be processed and made available to decision-makers at appropriate times. In planning a time frame, attention should then be focused on:

- optimum times of the year for collecting data in terms of local school district convenience;

- estimated time lags between receipt of SDIs by local school districts and the return of SDIs (or other medium containing MISVE data) to the state office;
- the time required for inputting and analyzing collected data; and,
- the anticipated schedule and volume for ad hoc and standard requests for information by state management and external agencies, (e.g., State Advisory Councils, U.S. Office of Education).

4. PLANNING FOR STAFF TRAINING

It should be recognized that any GDBMS, including SYSTEM 2000, can present a new problem for electronic data processing (EDP) analysts and systems programmers unfamiliar with this relatively recent development in computer software technology. In the past, a detailed knowledge of all reporting requirements was necessary before an application could be specified and implemented. The MISVE system uses a GDBMS, though, to gain the freedom to specify many reporting requirements as the need arises, rather than at design time. Some electronic processing analysts can hesitate or object to the implementation of GDBMS software; and their objections are sometimes based on their particular EDP philosophies, rather than on the technical adequacy of the GDBMS. Similarly, many data base systems programmers have been schooled in computer software concepts which dictate that large numbers of highly skilled EDP specialists are required to service the GDBMS itself rather than the application problem. Other systems programmers may react negatively to the adoption of a GDBMS because the latest GDBMS technology services systems programming needs while minimizing systems programmer involvement. It should also be recognized that the non-EDP application user who can only identify information needs in terms of numerous file "dumps" sorted in various sequences might not recognize the value of ad hoc selective reporting provided by the GDBMS.

In planning for installing MISVE, consideration, therefore, needs to be given to the attitudes toward GDBMS of EDP staff who will be involved in a MISVE installation. If negative attitudes toward GDBMS installation exist, one or more of the following approaches for promoting more positive attitudes on the part of EDP staff might be considered. The first approach is to schedule visits to other educaticnal institutions who utilize SYSTEM 2000 and/or other GDBMSs. A second approach is to schedule selected EDP staff to attend meetings of GDBMS users. Vendors of GDBMS computer software can supply information about the existence of user groups and the persons to contact for information about user-group meetings. A third approach is to have selected EDP staff enroll in vendor-supplied training courses to gain a more informed understanding of their role in GDBMS operations.

4.1 EDP Staff Training

In implementing MISVE, a number of EDP functions will be affected by the use of the GDBMS. Therefore, staff training is essential; however, the training requirements should be few and easily met.

Application Programmer Training

One or more application programmers must be trained in the use of SYSTEM 2000's PLI facility before the MISVE programs can be modified effectively. This is true of the non-PLI programs such as EDIT and SORTKEY because these programs validate and structure data in accordance with the requirements of the MISVE data base. The SYSTEM 2000 PLI course offered by the vendor is three days in duration. The application programmer can be greatly assisted in his debug and test activities if he has a knowledge of the SYSTEM 2000 self-contained natural languages. This course is five days long.

The plans for programmer training should also include time for the study of the MISVE prototype documentation and

source code as well as the experience of "operating" the prototype system prior to modification. CVE can be helpful with regard to this activity.

Systems Programmer Training

The design of SYSTEM 2000 eliminates the need for systems programmer support for such activities as system generation or operating system interfacing. Rather, SYSTEM 2000 operates as a problem program and is, therefore, handled much like any other application program. Generally, a systems programmer acts as the technical contact with MRI Systems Corporation and is responsible for placing the releases of SYSTEM 2000 provided by the vendor into the computer libraries. If the computing center elects to install the multi-user or multi-thread facilities, additional systems programmer training is required. In any case, the training is provided by MRI Systems Corporation in the one to two days MRI personnel are on-site for the initial installation of SYSTEM 2000.

If the custom of the computing center is to have the systems programming staff provide diagnostic support and/or optimization consulting to the applications programming staff, then a systems programmer should attend the PLI course, the self-contained natural language course, the data base design course, and the performance analysis methods courses. The total duration for these four courses is approximately three weeks.

Operations Personnel Training

Although no operations staff training is required by the GDBMS, the console operator may encounter "unusual" experiences if MISVE users exercise the natural language (non-programming) ability of MISVE SYSTEM 2000 to request tape services, acquire mass storage space, etc. If the computing center elects to use the multi-user, multi-thread facilities of SYSTEM 2000, a start-up/shut-down procedure must be learned by the console operators. This simple process is taught by

MRI personnel during the initial system installation.

There is one other operations staff function that may be affected by the use of the GDBMS - that function is I/O control. Since some of the data may be collected at a site not located near the computing center, some users may want the computing center's I/O control staff to be responsible for correction of minor edit errors. Some of these minor errors arise from data structure differences between the incoming data and the data base definition. In this case, a data base administrator or the responsible programmer should handle such problems or teach the I/O control staff to do so. Either the natural language course or the PLI course will provide an understanding of such basic data problems.

Data Base Administrator

Different organizations will view the role of a data base administrator (DBA) differently. Some emphasize the programmer role, others concentrate upon consulting and teaching functions, and still others stress the administration of the end-user's access to the data base. Frequently, organizations functionalize DBA responsibilities and distribute them among different MIS staff. Four basic SYSTEM 2000 courses can prepare a MISVE staff member to perform the various DBA functions.

4.2 Vocational Education Staff Training

One of the characteristics of SYSTEM 2000 that makes it suitable for the MISVE/GDBMS is the English-like self-contained language facility. Since this language often eliminates the need for programming support, some users may elect to provide selected members of the vocational education staff with training in its use. In this way, the need for programmer personnel can be minimized.

The natural language facility can be utilized in either the batch or interactive modes of communication. Therefore, a number of users outside the computing center could effec-

tively access the data base. While the language is English-like and is not a programming language, it is best used by trained personnel. This training is available in the five day natural language course.

This same course also includes training in the use of the natural languages to add, modify and delete data in the MISVE data base. Finally, the natural language course can prepare the application user to be responsible for many of the DBA functions. These functions include establishing and maintaining security provisions, data base definition modification, data base movement between disk and tape storage, performance monitoring, and user usage accounting in the multi-user environment. In the event that the SDVE selects an alternate GDBMS for use with MISVE, training of a related nature can be obtained through the vendor of the selected GDBMS.

RESOURCES NEEDED TO INSTALL AND OPERATE MISVE

SECTION II

RESOURCES NEEDED TO INSTALL AND OPERATE MISVE

SECTION II

This section provides estimates of resources that will be needed to install and subsequently operate MISVE. These estimates are based on project field trial experiences and information supplied by MRI Systems Corporation, the developer and vendor of SYSTEM 2000, the generalized data base management system (GDBMS) computer software package selected for use with MISVE.

Two sets of resource estimates were established on the basis of field trial experiences. The first set of estimates deals with those resources that are required to install MISVE. The second set of estimates deals with those resources that are required to operate MISVE in a production mode.

1. RESOURCES TO INSTALL MISVE

The major resources which need to be planned for prior to installing MISVE are:

- technical assistance services from The Center for Vocational Education (CVE);
- adequate numbers of MISVE management, technical, and clerical support staff and the salaries required for them;
- access to an IBM, CDC, or Univac computer and peripheral hardware and software support as described in the "MISVE Technical Description" document;
- funds to acquire the use of SYSTEM 2000 (or a GDBMS with similar capabilities);
- funds to train management information system (MIS) staff in the use of the generalized data base management system (GDBMS) computer software;
- funds to install the GDBMS by the vendor if the software is acquired through lease-purchase; and,
- costs to set up MISVE/GDBMS support programs.

1.1 Acquiring Technical Services from CVE

The MISVE project's scope of work did not include development of detailed installation and operations manuals. Until funds are made available for these manuals, users will find it desirable to secure technical assistance services from CVE to assist in orienting MIS staff to MISVE, and to assist with GDBMS installation. Costs for technical assistance will need to be negotiated with CVE; it is estimated that technical assistance costs will range from $3,000-$6,000.

1.1.1 staffing for installing MISVE

In a typical vocational education agency a full-time manager will be required to supervise MISVE technical and clerical support staff and to coordinate their service and maintenance activities. It is highly desirable that the MISVE manager be a person who has an understanding or working knowledge of current MIS technological developments. In any case, it is important that the MISVE manager begin to gain familiarity with these developments as well as training in SYSTEM 2000 concepts prior to, or during, the installation of MISVE. Such a knowledge base will prove highly advantageous to the MISVE manager who must make installation and subsequent implementation decisions based on interactions with MISVE technical support staff and agency management.

In planning for a MISVE technical support staff, consideration should be given to assigning persons familiar with data identification, source data instrument development, data collection and retrieval procedures, and computer center and software support operations. If the implemented MISVE is to achieve its full usefulness to management, the technical support staff will also need to have skills required to develop system documentation, provide for in-house staff training in MISVE operations, and design system assessment procedures. Once the system is installed, it would be desirable if a MISVE

technical support staff person had skills in statistical design and analysis. In any event, the MIS team might want to have access to persons with such skills for assisting with sampling and data analyses designs.

Adequate clerical staff should not be overlooked in planning for a MISVE implementation. Clerical support staff will be needed to prepare source data instruments for distribution to respondents; check completed data instruments in preparation for key stroking or optical scanning, and prepare reports for review by data users. The possibility also exists for training clerical staff to process ad hoc informational requests using SYSTEM 2000 interactive capabilities. Clerical staff might, therefore, be considered for inclusion in MISVE staff training.

A MISVE installation can be achieved within a 3 to 6 month time-frame. Estimated staffing to install and operate MISVE in state agencies are as follows:

. smallest states (in terms of vocational enrollments)

MISVE Manager	1.0 FTE
MIS Staff	0.5 - 2.0 FTE
Clerical Support	1.0 or more FTE

. medium to largest states (in vocational enrollments)

MISVE Manager	1.0 FTE
MIS Staff	1.0 - 3.0 FTE
Clerical Support	1.0 or more FTE

For many agencies no additional staff beyond that currently employed for MIS operations will be required for a MISVE installation.

1.1.2 costs to acquire SYSTEM 2000 or an alternate GDBMS with generally similar capabilities

SYSTEM 2000, or alternate GDBMS can be acquired under a variety of user-determined options. The user can elect to lease-purchase or rent the GDBMS from the vendor of the computer software package or purchase time and services from a

computer service bureau offering the GDBMS to its customers. In the latter instance, the costs for the use of the selected GDBMS are included as a surcharge on the bureau's basic costs for computer time and services. This option for GDBMS acquisition should be given careful consideration where a vocational education agency does not have access to adequate computer hardware, and teleprocessing software; or, computer core memory is inadequate to support the GDBMS's requirements. In some instances, it might prove more cost-effective to contract with a service bureau for computer time and services rather than acquiring the GDBMS directly.

Computer service bureaus offering SYSTEM 2000 or other GDBMSs to their subscribers can provide cost estimates for operationalizing MISVE's computer requirements in a production mode. Service bureaus will, however, need to have technical information upon which to base such estimates. The information requested from the MISVE staff will need to include estimates of the number of records in the MISVE data base, the frequency of data base accessing, the frequency and volume of updating operations, and the number of standard PLI report programs to be used with MISVE and the volume of these reports to be printed.

Based on current prices, paid up long-term (50 years and up) leases for the major GDBMS packages range between (approximately) $50,000-$90,000 depending upon the packages and options selected. On the assumption that the user will plan on the possibility that new computer software or hardware technology might make the GDBMS package (and its future versions which are included as part of the lease price) obsolete in ten years, the cost for acquisition will be $5,000-$9,000 per year. If 15 years is considered as a reasonable time-frame for the real life of the GDBMS package, the cost is prorated to between $3,500-$6,000 per year. Assuming a 20 year life span for the GDBMS, prorated costs drop to be-

tween $2,000-$4,500 per year. If a state department of education purchases the GDBMS and it is shared between two or more divisions of that agency costs to each division become one-half or less than the estimates just provided.

1.1.3 costs associated with training staff in the use of the GDBMS

One way to avoid the delays, wrong decisions, and poor implementation designs that arise from reliance upon older computer software technologies is to train key personnel in the use of the GDBMS during the early stages of the MISVE installation. The vendors of GDBMSs provide courses in the use of their systems, and various independent organizations offer seminars in GDBMS concepts. SYSTEM 2000 training courses range in duration from three to five days each. This training will be useful in the refinement of the operational data base definition and will be necessary to customize the detailed computer software design specifications. A basic course is provided for non-EDP oriented staff to familiarize them with an overview of GDBMS operations and with the procedures for accessing MISVE data bases using the natural language capabilities of the GDBMS. Given the staffing pattern for MISVE as found in section 1.1.1, staff training is estimated as costing between $1,000-$4,000.

The problems associated with training the data collection staff to distribute and collect MISVE source data instruments, to process corrections, and to prepare MISVE source data instruments for conversion to machine readable formats are sufficient to require special attention by many education agencies. Because the GDBMS is not directly involved in these activities, no specific attention is devoted here to such training needs. Also, it is assumed that the EDP and/or vocational education staffs to be involved in the MISVE installation are experienced with developing automated systems. If this is not true, the

user is urged to seek technical assistance from The Center with the implementation of the overall project.

1.1.4 costs associated with GDBMS installation

Agencies purchasing a copy of SYSTEM 2000 or other GDBMS will need to have the vendor install the software at a designated computer center. Charges for this service generally range between $1,000-$2,500. As new versions of the GDBMS become available these are supplied to users. There are no installation costs for new versions. Users can operationalize new GDBMS versions using instructions and materials supplied by the vendors.

1.1.5 costs for setting up MISVE/GDBMS support programs

The following tasks need to be carried out prior to loading a MISVE data base. These tasks assume the use of SYSTEM 2000.

- copy SYSTEM 2000 master tape to disk;
- select modules needed, link-edit, and store in working load module library;
- generate command procedures and catalogue procedure libraries;
- pre-compile, compile and link-edit MISVE utility programs. Store utility programs in load module library;
- save load module library and procedure libraries on tape; and,
- define data base.

Costs for these required procedures are estimated at $100.

1.2 Planning for Resources to Operate MISVE

The major activities and resources required for operating MISVE include:

- data instrument preparation and data collection procedures;

- funds for converting raw data to machine readable formats;
- funds for vendor-supplied GDBMS maintenance services; and,
- funds for computer time and computer center services.

1.2.1 data instrument preparation, data collection, and funds required for conversion of source data to machine readable format

MISVE does not prescribe source data instrumentation design or data collection procedures. This is one of the design features of the system which is intended to promote system flexibility. Project staff cannot, therefore, estimate costs for these activities.

Most state divisions of vocational education (SDVEs) prepare source data instruments (SDIs), send these instruments out to all local education agencies for completion, and then keypunch or optical scan the responses on the instruments returned to the state office. Completing state initiated SDIs often becomes both a major time burden and cost to local education agencies, and especially to those enrolling large numbers of vocational education students. As a result, there is often great resistance by local education agencies to completing SDIs sent to them by the state educational agency. This resistance can lead SDVEs to reduce the size and comprehensiveness of their MIS data bases, thus reducing the potential usefulness of the MIS to management. However, regardless of data base size, SDVEs find that there are significant costs associated with converting SDI responses to machine readable formats. If source data are very extensive it is possible that costs for conversion of raw data to machine readable format can be a major cost associated with MIS operations.

Few states have explored the combinations of multiple options available for collecting and inputting data. These

options include using data input clerks at the local level, using data already collected and on tape at local education agencies, and a combination of keypunching, optical scanning, and keying to tape. Many local education agencies, and especially community colleges and large city school systems, have computerized data which can be reformatted to make them compatible with MISVE formats.

The MISVE data base does not translate into a fixed number of records. Therefore, it is very difficult to estimate an average number of records per state for the purpose of estimating keypunch (or other data conversion procedure) costs. Also, the use of keypunching for all of the MISVE data will likely become prohibitive, especially in the states with very large vocational educational enrollments unless sampling procedures are used. In terms of what has been said in this section of the report it is very important that a SDVE examine its current policies with regard to data collection and data conversion techniques in planning for a MISVE implementation.

1.2.2 costs for computer time and computer center services

Computer time and computer center services were purchased from the Instructional and Research Computer Center (IRCC), The Ohio State University. Two data bases were used during the field trial: a simulated MISVE data base containing approximately 10,000 records, and a MISVE/Colorado data base containing approximately 250,000 records. The IRCC computer was an IBM 370/168. SYSTEM 2000, version 2.45, was used as the data manager.

The following represent computer costs for the data bases used during the field trial of MISVE:

. edit MISVE data using EDIT program	$ .16/1000 records
. sort edited data using SORTKEY program in preparation for loading MISVE data base	$ .48/1000 records
. load MISVE data base using LOAD program	$1.23/1000 records
	$1.87/1000 records

These three operations are generally performed once each year unless the user decides to reorganize the MISVE data base.

The MISVE user might want to periodically update his data base. Updating of small amounts of data can be done in the natural language via computer terminal. It is, however, more efficient to use the UPSTAFF, UPSTUD, and TABLOAD programs when large amounts of data are to be entered into the data base. Costs associated with the procedural language update programs are estimated as follows:

. for UPSTAFF	$1.23/1000 records
. for UPSTUD	$1.23/1000 records
. for TABLOAD	$1.23/1000 records

The following cost estimates are associated with maintaining the MISVE data base:

. disk storage of load module library and procedure libraries 120 tracks @ .02/track/day	$72/mo.
. storage of tapes 9 tracks @ .03/tape/day	9/mo.
	$81/mo.

The MISVE user will want to generate interactive output using the natural language. Costs for browsing the MISVE data base range from $.25 to $1.50 per inquiry. The complexity of the inquiry and the size of the data base being searched are two factors which influence inquiry costs. If one assumes a typical user might require 15 inquiries per day for 250 days per year at an average cost of $1.00 per inquiry (including line time) the yearly cost will be $3,750.

1.3 Summary of Costs to Operate MISVE

A set of estimated costs to operate MISVE are provided next. These estimates do not reflect source data instrument preparation, data collection, or the costs of converting SDI responses to machine readable format. In calculating the estimates it is assumed that:

- MISVE staff consists of 1.5 - 4.0 FTE professionals and 1.0 - 4.0 FTE clerical persons;
- the user lease-purchases a GDBMS. The useful life of the product is 15 years. The initial cost of the GDBMS is $75,000 and maintenance is $5,000 per year;
- costs for computer time and services are similar to charges by the Instructional and Research Computer Center, The Ohio State University;
- computer service bureau costs for operationalizing MISVE may be more or less than those reported here; and,
- the MISVE data base contains anywhere from 250,000 to 1,500,000 records.

Under these conditions the estimated costs for operating MISVE range from $66,000 to $170,000. A breakdown of these costs is found in Table 1, Yearly Costs to Operate MISVE.

Table 2 lists the per student costs to operate MISVE. These estimates are based on the same assumptions as those used to produce the estimates reported in Table 1.

MISVE is a complex but flexible product. Its prototype data base can be modified and extended; the format and content of source data instruments are user-determined; data collection procedures are not mandated; keypunching, optical scanning, a combination of these and other data input procedures can be used to convert raw data to machine readable format; GDBMS source code can be obtained under a variety of acquisition options from a number of vendors; computer time and services can be obtained from state sources or from commercial service bureaus, and rates for computer time and computer center services can vary significantly. MISVE is designed to

Table 1

YEARLY COSTS TO OPERATE MISVE

Staff Costs	
Professional @ $25,000/person	$37,500-100,000
Clerical @ $10,000/person	$10,000- 40,000
GDBMS Acquisition and Maintenance	$10,000
Maintaining MISVE Data Base	

Total Records	250K	500K	750K	1.5M	
Tape Storage	900	900	900	900	
Organizing Data Base	467	935	1,400	2,805	
Updating 20% of Records	62.50	123	185	369	
Accessing Data Base	5,000	7,000	9,000	12,000	
Misc. Computer Center Services and Line Time	2,000	2,000	3,000	4,000	
	8,429	11,958	14,485	20,074	$ 8,429- 20,074
					Totals $66,000*-170,100

*Rounded to next highest hundred

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Table 2

YEARLY PER STUDENT COST TO OPERATE MISVE

Number Students in Educational System	Staff Costs	GDBMS Costs	Maintaining Data Base	Total Costs*	Cost Per Student
50,000	1.5-2.0 FTE Professionals 1.0-1.5 FTE Clerical 47,000-65,000	10,000	8,500	66,000-77,500	$1.32-1.52
100,000	2.0-3.0 FTE Professionals 2.0 FTE Clerical 70,000-95,000	10,000	12,000	92,000-117,000	$ .92-1.17
250,000	3.0-3.5 FTE Professionals 2.5 FTE Clerical 100,000-112,500	10,000	14,500	124,500-137,000	$ .49- .55
500,000	4.0 FTE Professionals 3.0-4.0 FTE Clerical 130,000-140,000	10,000	20,000	160,100-170,100	$ .32- .34

*Excluding SDI preparation, data collection, and conversion to machine readable format

promote interaction with its data bases while providing the capability for generating standard reports, and the use of a GDBMS can reduce staff time now used for computer programming and other software service and maintenance functions. It is this system flexibility that allows users to tailor the system and "fine-tune" its performance in line with the availability of funds for its operation.

2. PLANNING FOR SELECTING AND IMPLEMENTING A GDBMS FOR USE WITH MISVE

In planning for installing MISVE a user might desire to consider the use of a GDBMS other than SYSTEM 2000. This could come about because first, the user might have different criteria which need to be considered in operationalizing computer software than did project staff. Second, the user might place a different interpretation on the data used by MISVE project consultants in suggesting SYSTEM 2000 for MISVE. Third, the user might prefer a different selection procedure for selecting among alternate GDBMSs. In the event that a GDBMS other than SYSTEM 2000 is selected for use with MISVE, the user will need to recognize that costs and time will need to be budgeted for development of software products and system documentation.

Costing out the acquisition of a GDBMS should not be carried out in isolation from concerns over continuing costs for GDBMS operations and maintenance. What might be a less expensive GDBMS package at the time of a MISVE installation might prove to be a more expensive item in the long run given the wide range of computer hardware, core memory and overhead requirements of the different packages in batch and interactive modes of operation, and the reliability of the vendor to maintain and upgrade the GDBMS product. Before deciding on whether to acquire SYSTEM 2000 or an alternative GDBMS, a careful analysis of each GDBMS should be conducted by persons who have experience in the selection of computer software packages.